APPLICATION OF A "SEALED CAN TECHNIQUE" AND CR-39 DETECTORS FOR MEASURING RADON EMANATION FROM UNDAMAGED GRANITIC ORNAMENTAL BUILDING MATERIALS

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Radon (^{222}Rn) is the most important cause of exposure to mankind due to natural radioactivity, with almost 50 percent contribution of the total. Radon is a noble gas originated from the ^{238}U series, and is generated by the ^{226}Ra alfa decay with a recoil energy of 86 keV. Depending on the composition of the material where radon is generated, the recoil nuclei of radon can be released to medium or can be retaint in grains. The radon exalation depends not only on the ^{226}Ra concentration in the material, but also on other factors such as mineralogy of the region, size and density of grains and porosity of the material.

As building materials are one of the major sources of environmental radon, the radiological implications of the use of materials with great content of uranium must be always assessed. The majority of researchers evaluate the indoors internal exposure index from radon through the activity concentration of ^{226}Ra calculated by gamma-ray spectrometry. However, depending on the building material composition, it is possible that the real radon concentration in the air would be higher or lower when comparing with the ^{226}Ra content, so, it is of great importance the knowledge of radon emanation. In this work, radon emanation from several undamaged granitic building materials used as ornamental rocks or coating tiles is determined using the "sealed-can technique" and CR-39 solid state nuclear track detectors (SSNTD). The commercial samples were sealed for 90 days inside a plastic container and a NPBR diffusion chamber with a CR-39 detector attached to the inside of the top lid of the container. After exposure, CR-39 detectors were etched for 5,5 hours with a 30 % KOH solution in a temperature-stabilized water-bath and mild stirring, at 80°C. The track densities were read under a Zeiss/Axiolab optical microscope connected to a video camera and a personal computer. Preliminary results for radon concentrations showed values of the same order that literature values, in a range from 85 ± 8 Bq.m^{-3} to 1073 ± 40 Bq m^{-3}. Further, the methodology will be validated with standard sources of ^{222}Rn.